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Typhus Scrub in a Medical Age Group in an Eastern India Tertiary Care Center: Clinical, Biochemical Profile and Complications

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ABSTRACT
In India, scrub typhus is the most often reported rickettsial infection and Orientia tsutsugamushi is the causal organism. Because of its variable appearance, lack of understanding about the disease, low level of suspicion among doctors and lack of diagnostic facilities in the community, scrub typhus is typically under diagnosed in our nation. To evaluate the clinical characteristics of young patients at a tertiary care facility in Eastern India who have been diagnosed with scrub typhus, with a focus on typical presenting symptoms, indicators and disease duration. to assess the biochemical markers of scrub typhus in children, such as complete blood counts, liver function tests and renal function tests, in order to spot typical lab abnormalities. The study design was Prospective observational study. Place of study were Department of Pediatrics Christian medical College, Vellore Chennai. 1 year. 100. Twenty (20.0%) patients in our study experienced fever, thirty (30.0%) coughed, fifteen (15.0%) experienced abdominal pain, twenty-five (25.0%) experienced vomiting and ten (10.0%) experienced icterus of symptoms. Z has a value of 3.5355. P has a value of.0004. At p <.05., the outcome is significant. We came to the conclusion that fever, rash and hepatosplenomegaly are prevalent symptoms of scrub typhus, which has a diverse clinical and biochemical profile in the juvenile population. Serious side affects such myocarditis, ARDS and multi-organ failure can result from delayed diagnosis, highlighting the importance of early detection and timely treatment.

INTRODUCTION

In India, scrub typhus is the most often reported rickettsial infection and Orientia tsutsugamushi is the causal organism[1]. Because of its variable presentation, lack of information about the disease, low level of suspicion among doctors and lack of diagnostic facilities in the community, scrub typhus is typically under diagnosed in our nation[2]. Mild to severe clinical symptoms are possible. It can be lethal and impact nearly every organ system. Timely identification and treatment are critical because of the high risk of harmful side effects and the rapid reaction to doxycycline. In India and around the world, the majority of research on rickettsial illnesses focuses on adult populations[3]. The majority of the few studies that are available on the incidence and clinical features of pediatric scrub typhus in the Indian subcontinent are retrospective studies or isolated case reports[4]. Therefore, in a tertiary care facility in Eastern India, this study (a prospective observational study) has been conducted to investigate the clinical characteristics and consequences of pediatric scrub typhus. This study may help in contributing our experiences with primary care physicians, as scrub typhus having nonspecific symptoms often leads to mis diagnosis. The results of this study may help primary care doctors identify and treat scrub typhus infections early on, preventing complications. Humans contract scrub typhus, a bacterial infection brought on by Orientia tsutsugamushi, when they are bitten by infected chiggers, which are larval mites. Children may have a slightly different clinical presentation and course of treatment than adults, even though scrub typhus can afflict people of all ages[5]. Scrub typhus frequently manifests in youngsters as vague symptoms like fever, headache, rash and muscular aches. Children may not be able to express their symptoms as well as adults, though, as is the case with many other illnesses. Because of this, diagnosing youngsters can occasionally be difficult. Parents and other adults who care for children must therefore be on the lookout for any indications of sickness, particularly if the child has been in an area where scrub typhus is endemic. A combination of clinical assessment, laboratory testing (such as serological testing to identify antibodies against O. tsutsugamushi) and occasionally imaging techniques to check for sequelae are used to diagnose scrub typhus in children.

MATERIALS AND METHODS

Study Design: Prospective observational study.

Place of Study: Department of Pediatrics District hospital Howrah & Midnapore Medical College and Hospital

Period of Study: 1 year.

Sample Size: 100.

Inclusion Criteria:

Age:

- Children aged 1 month-6month-10yr diagnosed with scrub typhus.

Confirmed Diagnosis:

- Positive serology for scrub typhus IgM antibodies using ELISA. Polymerase chain reaction (PCR) confirmation for Orientia tsutsugamushi, if available.

Hospital Admission:

- Patients admitted to the tertiary care center for evaluation and management of febrile illness with suspected or confirmed scrub typhus.

Clinical Presentation:

- Patients presenting with signs and symptoms consistent with scrub typhus, such as fever, rash, eschar, lymphadenopathy, hepatosplenomegaly, or organ dysfunction.

Informed Consent:

- Parents or guardians of the pediatric patients providing informed consent for participation in the study.

Exclusion Criteria:

Negative Serology:

- Children who test negative for scrub typhus IgM or PCR for Orientia tsutsugamushi.

Other Confirmed Infections:

- Patients with a confirmed diagnosis of other infectious diseases (e.g., malaria, dengue, leptospirosis) that could account for their clinical presentation.

Chronic Illness:

- Children with pre-existing chronic illnesses (e.g., congenital heart disease, chronic renal disease, immuno deficiencies) that may interfere with the study outcomes.

Incomplete Medical Records:

- Patients whose clinical and laboratory data are incomplete or insufficient for comprehensive analysis.

Previous Hospitalization:

- Patients who were previously treated and hospitalized for scrub typhus within the past 3 months to avoid recurrent cases being mis classified.

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0., SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests, which compare the means of independent or unpaired samples, were used to assess differences between groups. Paired t-tests, which account for the correlation between paired observations, offer greater power than unpaired tests. Chi-square tests (χ^2 tests) were employed to evaluate hypotheses where the sampling distribution of the test statistic follows a chi-squared distribution under the null hypothesis., Pearson's chi-squared test is often referred to simply as the chi-squared test. For comparisons of unpaired proportions, either the chi-square test or Fisher's exact test was used, depending on the context. To perform t-tests, the relevant formulae for test statistics, which either exactly follow or closely approximate a t-distribution under the null hypothesis, were applied, with specific degrees of freedom indicated for each test. P-values were determined from Student's t-distribution tables. A p-value #0.05 was considered statistically significant, leading to the rejection of the null hypothesis in favour of the alternative hypothesis.

RESULTS AND DISCUSSIONS

Table1: Distribution of Symptoms

Symptoms	Frequency	Percentage
Fever	20	20.0%
Cough	30	30.0%
Pain abdomen	15	15.0%
Vomiting	25	25.0%
Icterus	10	10.0%
Total	100	100.0%

Table2: Distribution of Complications of Scrub Typhus

Complications of scrub typhus	Frequency	Percentage
Pneumonitis	10	10.0%
Meningoencephalitis	25	25.0%
Septic Shock	10	10.0%
ARDS	15	15.0%
Myocarditis	20	20.0%
AKI	20	20.0%
Total	100	100.0%

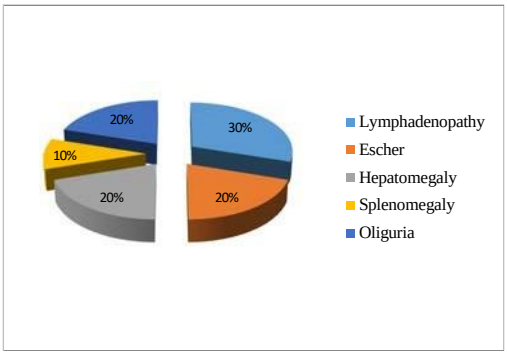

Fig. 1: Distribution of Signs

In our study, 20 (20.0%) patients had Fever, 30 (30.0%) patients had Cough, 15 (15.0%) patients had Pain abdomen, 25 (25.0%) patients had Vomiting and 10 (10.0%) patients had Icterus of symptoms. The value of z is 3.5355. The value of p is .0004. The result is significant at p<.05. In our study, 10 (10.0%) patients had Pneumonitis complications, 25 (25.0%) patients had Meningoencephalitis, 10 (10.0%) patients had Septic Shock, 15 (15.0%) patients had ARDS, 20 (20.0%) patients had Myocarditis and 20 (20.0%) patients had AKI of Complications. The value of z is 2.7915. The value of p is .00528. The result is significant at p<.05. There were 100 cases in all that were part of our study. The age group most frequently impacted was 1-5 years old, which is consistent with previous Indian research. Male children outnumbered females in our study by a ratio of 1.68:1, which is consistent with findings from other studies. Like previous studies, fever was the presenting ailment in every case. Additional symptoms included headache, altered sensorium, vomiting, seizure, cough and abdominal pain. Similar to another study, hepatomegaly (56.5%) and splenomegaly (39.7%) were common examination results. In our study, like in some others, 27.3% of cases had Escher, the most pathognomonic symptom of scrub typhus. But according to Pataki *et al.,* Escher was only discovered in 11.8% of cases[6]. Therefore, even though Escher is a hallmark of scrub typhus, it may not be present in the majority of cases and in endemic locations after the monsoon season, a high clinical suspicion is essential. Less frequent symptoms in this study included icterus, oliguria, lymphadenopathy and enema. Anaemia was observed in 24.4% of cases and leucocytosis in 44% of cases upon inquiry. Similar findings were also found in earlier research. 23.4% of children had thrombocytopenia, which is comparable to the northeast study. In our investigation, hypernatremia was found in 36.4% of cases. Pathak[6] 48.7% of cases had hypernatremia. We found that the average CRP value was 52.9±35.7mg/L, with a range of 4-194mg/L. The majority of cases (93.3%) had raised CRP (>10 mg/L), 47.4% had very high CRP (>50mg/L), and 5.7% had extremely high CRP (>100mg/L). Previous investigations revealed a similar effect of increased CRP (>6mg/L).Hepatic dysfunction was discovered in 65.6% of patients. AST elevation (>80 U/L), which was observed in 60.5% of patients, was the most frequent LFT anomaly. In 27.1% of instances, there was an ALT elevation (>80 U/L). Previous investigations also found a similar increase in transaminases (ALT and AST). Only 10% of cases had hypoalbuminemia (<3 g/dL). Nonetheless, hypoalbuminemia was found in 38.4%, 52.2% and 54% of cases by Sarangi[7], Dass[8] and Kumar[9]. Like previous research, we discovered hyper bilirubinemia (TSB >1mg/dl) as a less frequent feature

(2.9%) patients. 2.4% of the cases in this research had coagulopathy (PT$15 s). No coagulopathy was seen in another Taiwanese research. Lung involvement was the most frequent complication in our study (20.6%). According to a different study conducted in Thailand and Odisha, pneumonitis is the most frequent side effect. Meningoencephalitis was the second most frequent consequence in this study (12.4%). Similar rates of meningoencephalitis have been reported in other investigations. Septic shock occurred in 8.6% of cases in our study. Comparatively speaking, Bhat[10] studied this less (25.8%). Early diagnosis and treatment may be the cause of this discrepancy. Similar to previous investigations, ARDS was detected in 5.7% of cases. Like other research, we found myocarditis in 4.8% of cases. AKI was found in 4.3% of cases., a research from the northeast showed a similar finding. Twenty-seven of the 38 individuals in our study that underwent CSF analysis were found to have scrub meningoencephalitis. Similar to a few Indian investigations, the CSF analysis revealed lymphocyte predominance, a mild protein increase and normal glucose. The average length of stay in the hospital during this investigation was 7±2.1 days. The average hospital stay in Odisha was 7.62±4.46 days, according to another study. Our study's mortality rate was 1%, which is lower than the respective rates of 15%, 12%, 9% and 4.7% reported by Kamarasu[11]. Early diagnosis, treatment and referral to our centre may be responsible for this. A neglected rickettsia disease that is common in our nation and is on the rise is scrub typhus. A high level of suspicion and understanding of the geographic distribution and clinical symptoms are crucial for prompt diagnosis, treatment and a positive outcome. The results of this study may help primary care physicians identify and treat scrub typhus early. Primary care doctors have a vital role to play in keeping this dangerous clinical entity from becoming a major public health issue in an environment with limited resources like ours.

CONCLUSION

We concluded that scrub typhus presents a varied clinical and biochemical profile in the pediatric population, with fever, rash and hepatosplenomegaly being common features. Delayed diagnosis can lead to severe complications such as ARDS, myocarditis and multi-organ dysfunction, emphasizing the need for early recognition and prompt management. The study highlights the importance of maintaining a high index of suspicion for scrub typhus in children with febrile illness in endemic regions. Early diagnosis and appropriate antibiotic treatment are key to preventing severe outcomes and reducing morbidity and mortality.

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